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(54) Title: FITMENT FOR FLEXIBLE CONTAINERS			
(57) Abstract A fitment (20) for a container of the type having sides made of flexible heat sealable material has a tubular neck (21). A cap may be secured to an upper portion of the neck using threads (23). A heat sealable skirt (22), to which the container sides may be heat sealed, depends from an outwardly flared portion (25). The skirt has a heat sealable outer surface and a material thickness less than the material thickness of the neck.			

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FITMENT FOR FLEXIBLE CONTAINERSTECHNICAL FIELD

This invention relates to closure fitments for flexible containers.

BACKGROUND OF THE INVENTION

Containers for liquids and fungibles, such as various consumer and household products, are commonly in the form of rigid bottles such as those made of glass and blow molded plastic. These are commonly constructed with tubular necks which, when capped, provide a closure. The necks and caps are usually threaded although some are constructed with clip on and press on caps.

Recently containers have been developed that are made of thin, flexible material, principally plastic film. In order to provide a firm structure to which a cap may be secured, such flexible containers are provided with fitments. Exemplary of these fitments is that shown in U.S. Patent No. 5,348,525. This fitment basically is a tube having a threaded neck on which a cap may be threaded and an enlarged, grooved base to which the container film is heat sealed. The top edge of the container itself extends linearly and laterally from the fitment base. Another fitment design for a flexible container has a

-2-

threaded tubular neck from the bottom of which a large, curved base extended. It is sealed in an upper corner of the container to provide a pour spout when the container is tilted manually with a container handle.

5 The just described fitments have had certain distinct problems. For example, they have been difficult to heat seal in place in an efficient manner due to their having to be relatively thick in order to provide sufficient body on which to secure a cap. They also have been difficult to 10 seal without creating wrinkles in the thin container film. This is particularly true where the shape of the container in the region adjacent the fitment is curved. In addition, their substantially cylindrical external shape has made it difficult to hold them in place during on line sealing 15 operations without axial slippage or rotation.

Accordingly, it is seen that a need exists for a fitment for flexible containers that alleviates the just described problems. It is to the provisions of such that the present invention is primarily directed.

20

SUMMARY OF THE INVENTION

In a preferred form of the invention a fitment for a container of the type having a body made of flexible heat sealable material has a tubular neck upon an upper portion 25 of which a cap may be secured. The neck also has a lower portion from which heat sealable skirt depends and to which the container body may be heat sealed. The skirt has a heat sealable outer surface and a material thickness less than the material thickness of the neck.

30 In another preferred form of the invention a fitment for a container of the type having a body made of flexible heat sealable material has a tubular neck with an upper portion on which a cap may be secured, an intermediate support portion, and a lower portion that flares outwardly 35 from the intermediate support portion. A heat sealable

skirt depends from the neck lower portion to which the flexible container body may be heat sealed.

BRIEF DESCRIPTION OF THE DRAWING

5 Figs. 1-5 illustrate, in perspective, a sequence of steps taken in mounting fitments that embody principles of the present invention to the bodies of flexible containers.

Figs. 6-7 illustrate from two different perspective views of the finished container with fitment attached.

10 Fig. 8 is a perspective view of a flexible handling and transport device in a configuration for receiving a flexible container.

15 Fig. 9 is a perspective view of the flexible handling and transport device of Fig. 8 in a container held configuration holding a flexible container by its fitment.

Figs. 10-14 show in greater detail the sequence of steps taken in sealing the fitment to the body of the container.

20 Fig. 15 is a cross sectional view of the fitment.

DETAILED DESCRIPTION

With references next to the drawing, and initially to Fig. 15 in particular, a fitment 20 is shown that embodies principles of the invention in a preferred form. The fitment is of unitary, plastic construction and has a tubular neck 21 and a flared skirt 22. The tubular neck has an upper portion 21 with external threads 23 and an outwardly flared lower portion 25. It also has a support portion 26 intermediate the upper and lower portion which includes a flange or protrusion 27 with an hexagonally shaped periphery.

30 The bottom end of the neck lower portion 25 is formed with an annular lip 28. The flared skirt 22 depends from the end of the neck lower portion inside of its lip 28. Here the skirt flares outwardly from the neck at an acute

-4-

angle α with respect to the axis x of the tubular fitment. Although this angle varies generally to match the shape of the flexible container in the area about the fitment, the angle shown here is about 13° , rendering it suitable for 5 the container shaped as shown in the other figures. Although the angle α may be from 0° to 90° i.e. to the very boundaries of the definition of acute angle, preferably it is between these limits.

10 The fitment is preferably made of low density polyethylene. The container itself may be made of a flexible polyethylene film. The skirt 22 has a thin wall with respect to that of the neck 21, the skirt here varying from 15 mils at its open end distal the neck to 20 mils at its proximal end. The wall thickness of the neck lower 15 portion is 33 mils here. The rest of the neck has variable wall thicknesses in excess of this.

20 The thinness of the skirt 22 enables a high quality heat seal to be made to the container material efficiently in minimal time, typically 0.75 seconds. This enables it to be sealed in economically viable, high speed manufacturing operations. The angled flare to the skirt 22 renders it relatively easy to be sealed to the container without creating wrinkles as with bottles with a curved upper wall profile since the shape of the container over 25 the skirt matches that of the skirt itself.

20 Figs. 1-5 illustrate a sequence of steps taken in sealing the fitments 20 to containers as the containers are themselves being made from a continuous web of thin, heat sealable, plastic film. In these figures the film is being advanced from right to left as indicated by the light arrows in each figure. The film has been formed into the general shape of a double walled T to have a partially formed container bottom 30 from which two principal, spaced, container sides 31 extend. As the film advances 35 the two sides 31 are brought into positions straddling a

mandrel 34 in an array of three mandrels mounted to a support 35. The fitments 20 are mounted on movable positioning member 37.

With continued reference to Figs. 1-5 and also to Figs. 10-14, the mandrels and positioning members with fitments are now converged as indicated by the dark arrows in Figs. 1 and 10. This serves to seat the fitment skirt 22 on the mandrel 34 as shown in Fig. 2. Two heat sealing dies 39 with confronting, spaced, flat surfaces are then converged upon the flexible film sides 31 straddling the mandrel, as shown best in Figs. 10 and 11. This creates two direct fitment emplacement seals 40 as shown in Figs. 3 and 11 between the sides 31 straddling the fitment. The mandrels and positioning members are then spread, the film advanced and the mandrels and positioning members again converged. As shown in Figs. 4 and 12 this creates two a band seals between the film sides 31 and the fitment skirt 22. As this is done the presence of the fitment lip 28 prevents the container material from creeping onto the neck lower portion 25.

Again the mandrels and supports are spread, the film web advanced, and the mandrels and supports converged whereupon a secondary, overlaid seal 42 is formed by heat sealing dies 44 as shown in Figs. 13 and 14. The fitment 20 is now fully sealed to the sides as shown in Figs. 6 and 7 forming a flexible container 44. Note that in these figures two side seals 45 have now also been formed that extend from the fitment seals 41 and 42.

With reference next to Figs. 8 and 9, a container transport module (CTM) or puck 50 is shown for use in transporting the flexible containers 44 with secured fitments 20 through various process stations as for testing, filling and the like. Fig. 8 shows the CTM with its two arms 51 in a spread apart, open configuration to receive a container. These arms support two cantilevered,

-6-

5 mating grippers 52 with confronting, semi-hexagonal surfaces 54. With a container 44 positioned between the arms 51 the arms are converged as shown in Fig. 9. This brings the semi-hexagonal surfaces of the grippers into contact with the hexagonal flange 27 of the fitment. With the flange 27 being the thickest portion or strong point of the fitment, a firm and secure grip is established by the CTM on the container. The CTM may now be conveyed itself and thereby transport the container suspended from the 10 grippers 52, without the container being able to rotate, through various process stations.

15 It thus is seen that a fitment is now provided for flexible containers that alleviates problems associated with those of the prior art. It should be understood however that the embodiment just described in detail merely illustrates principles of the invention in its preferred form and that many modifications may be made thereto without departure from the spirit and scope of the invention as set forth in the following claims.

CLAIMS

1. A fitment for a container of the type having a body made of flexible heat sealable material, and with the fitment having a tubular neck upon an upper portion on which a cap may be secured and a lower portion, and a heat sealable skirt that depends from said neck lower portion to which the container body may be heat sealed, said skirt having a heat sealable outer surface and a material thickness less than the material thickness of said neck.

2. The fitment of claim 1 wherein said neck upper portion is threaded.

3. The fitment of claim 1 wherein said tubular neck has a support portion intermediate said neck upper portion and said neck lower portion this is configured to be gripped by ancillary container handling apparatus.

4. The fitment of claim 3 wherein said neck support portion has a plurality of flat sides configured to be gripped and restrained from rotating by ancillary mating container handling apparatus.

5. The fitment of claim 3 wherein at least part of said neck support portion has a material thickness greater than the material thickness of said neck upper and lower portions.

6. The fitment of claim 1 wherein said skirt flares conically outwardly from said neck lower portion.

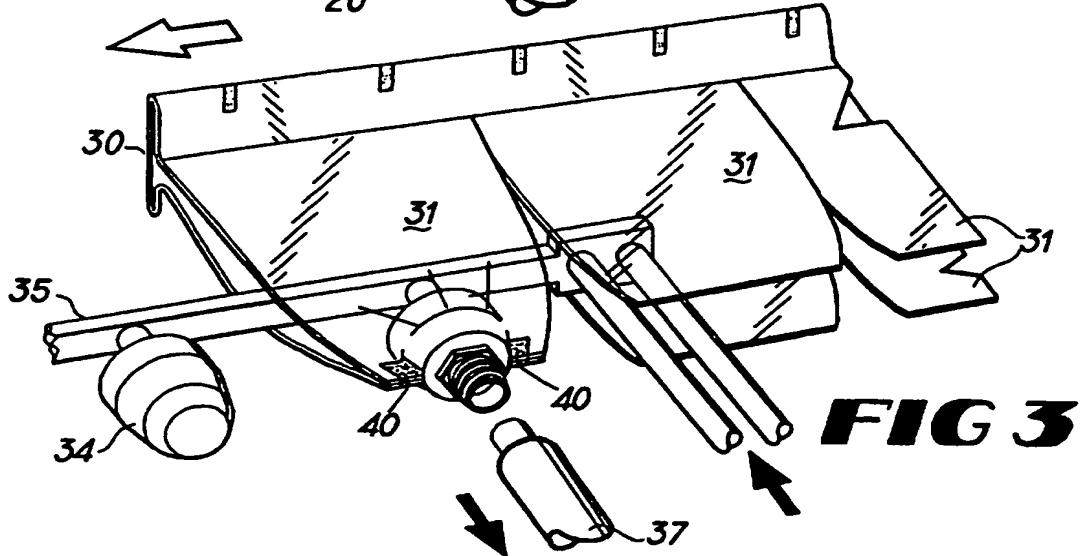
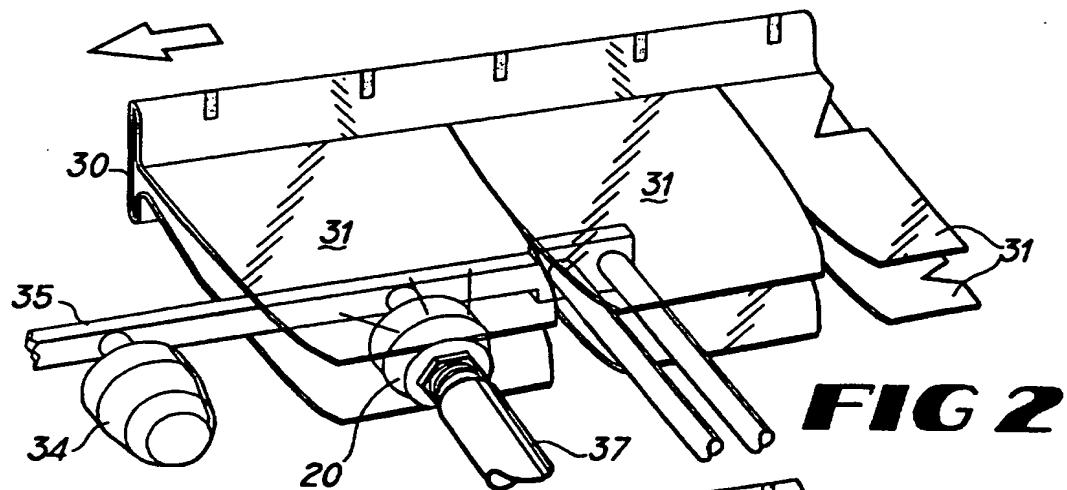
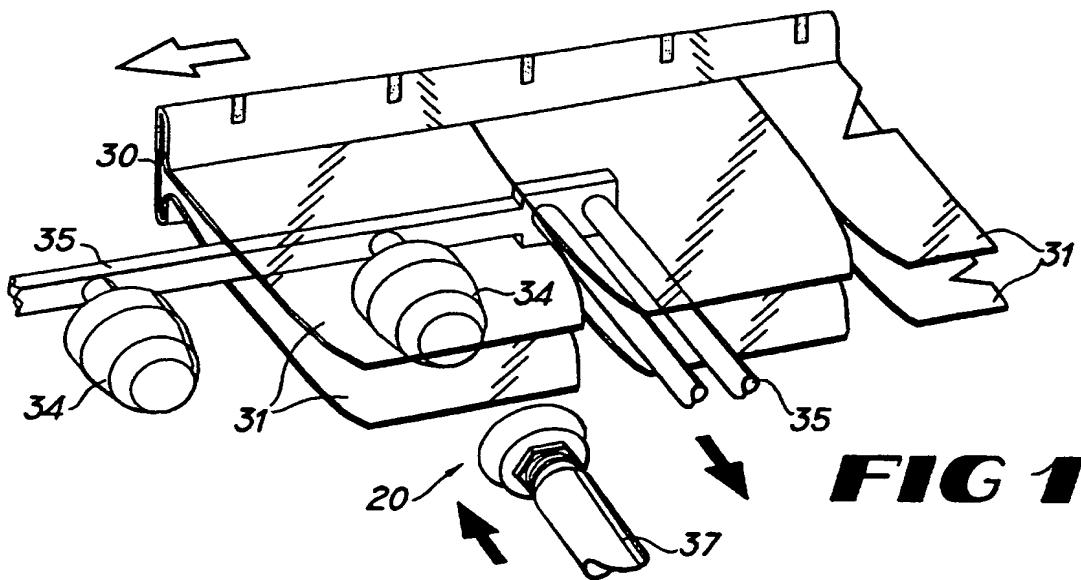
7. The fitment of claim 6 wherein said tubular neck has an axis, and wherein said skirt flares conically outwardly from said neck lower portion at an acute angle.

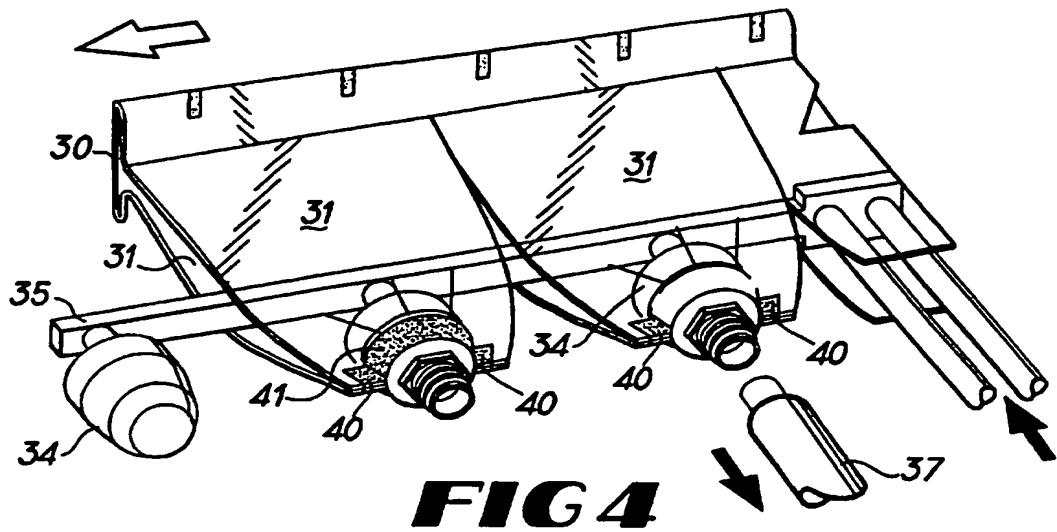
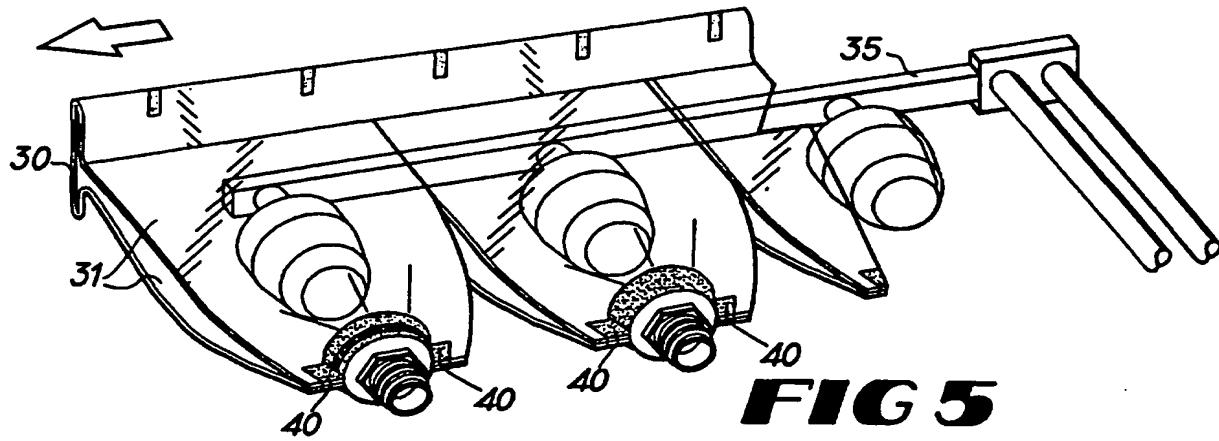
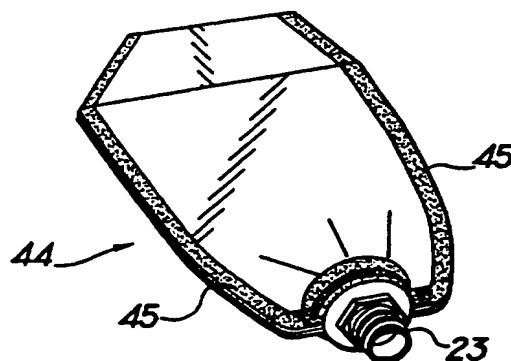
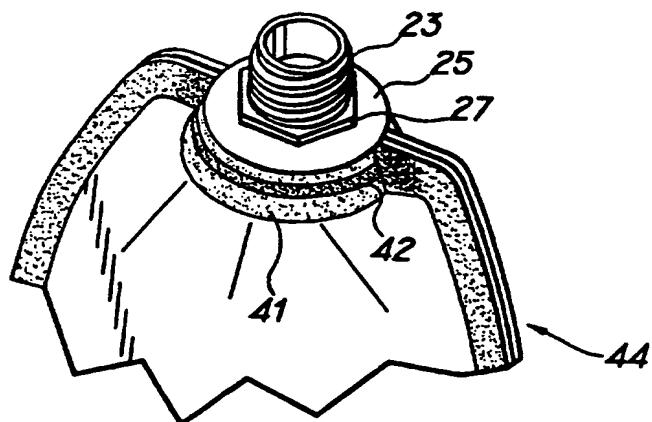
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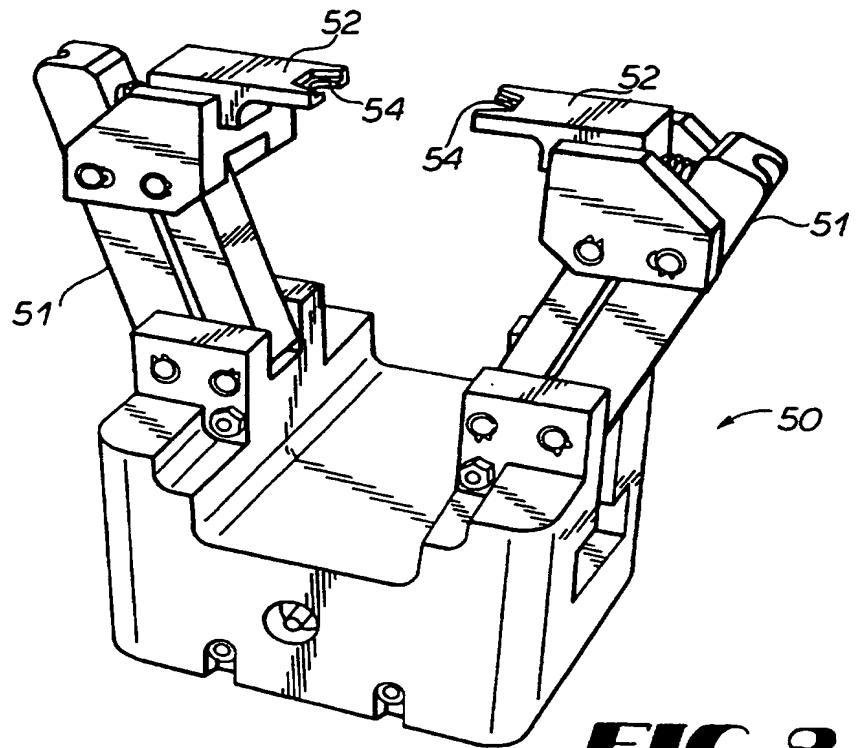
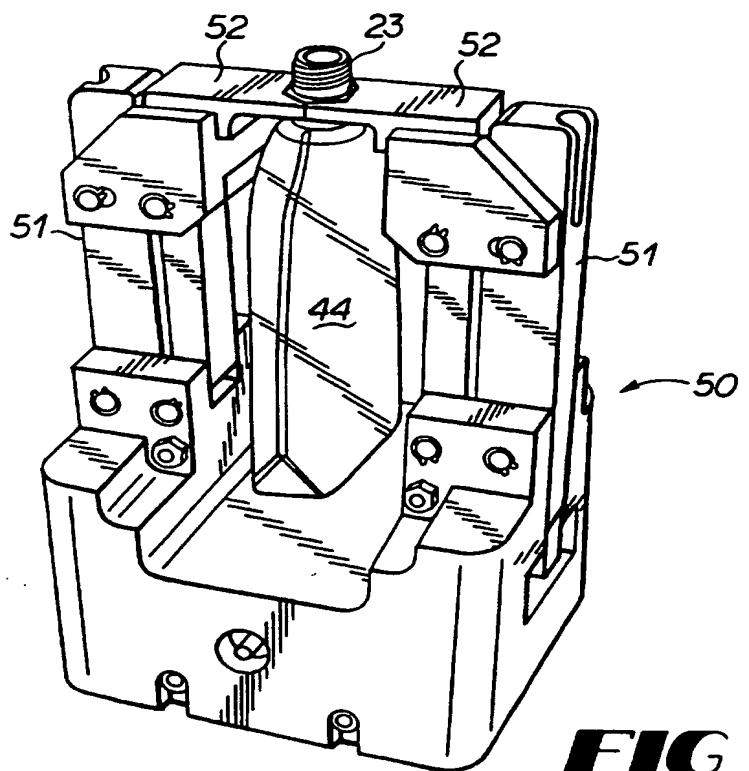
8. The fitment of claim 7 wherein said tubular neck lower portion flares conically outwardly from said axis.

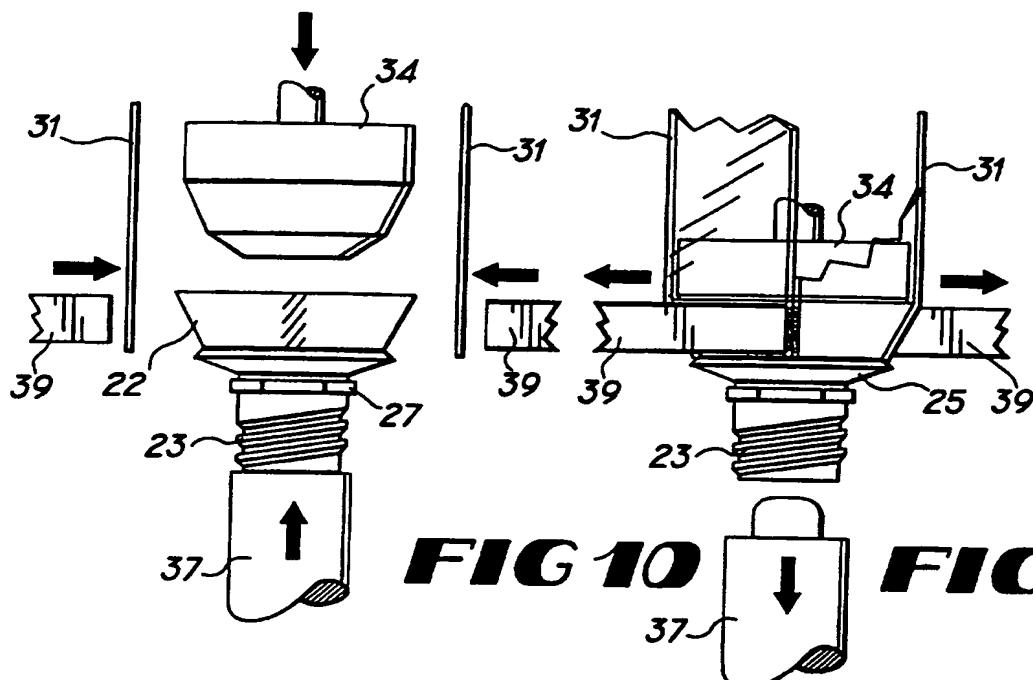
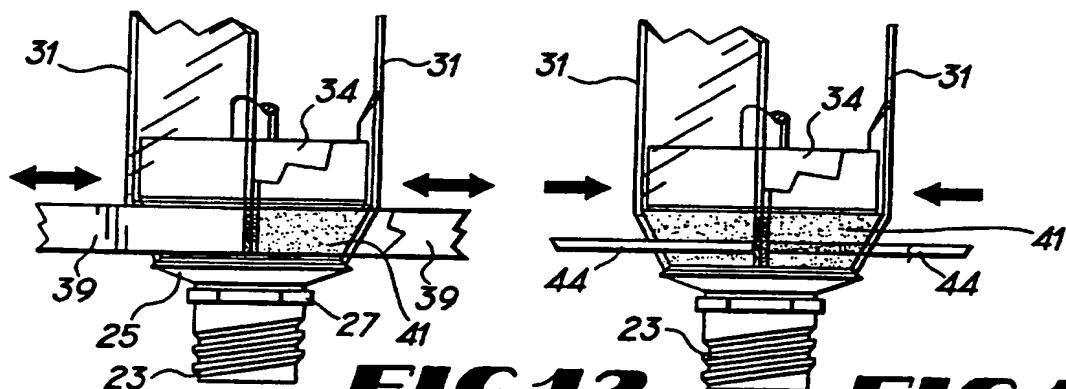
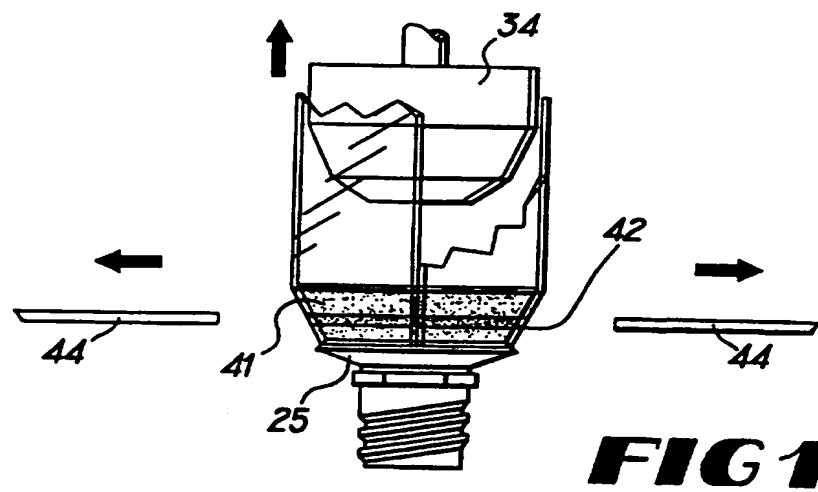
9. A fitment for a container of the type having a body made of flexible heat sealable material, and with the fitment having a tubular neck with an upper portion on which a cap may be secured, an intermediate support portion, and a lower portion that flares outwardly from said intermediate support portion; and a heat sealable skirt that depends from said neck lower portion to which the flexible container body may be heat sealed.

10. The fitment of claim 9 wherein said skirt flares outwardly from said neck lower portion.



**FIG 4****FIG 5****FIG 6****FIG 7**

**FIG 8****FIG 9**

**FIG 10****FIG 11****FIG 12****FIG 13****FIG 14**

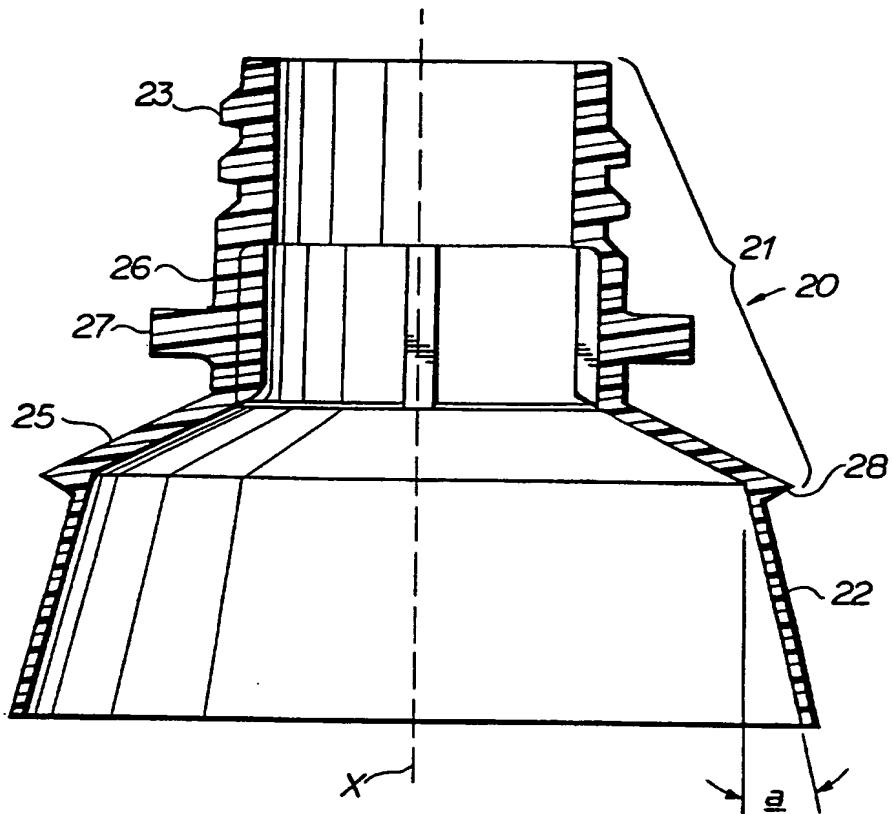


FIG 15

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/14546

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :B65D 33/38, 41/04
US CL :215/43; 222/107; 383/80, 95

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 215/43; 222/107, 215; 383/80, 94, 95, 96

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 4,415,085 (CLARKE ET AL.) 15 November 1983, See col. 7, lines 10-63	1-10
Y	US, A, 5,036,889 (PHERIGO) 06 August 1991, See col. 1, lines 48-56	1-10
Y	US, A, 4,142,630 (HAYES ET AL.) 06 March 1979, See Fig. 2	1-8

Further documents are listed in the continuation of Box C. See patent family annex.

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